

**CLAIMS**

1. An electrochemical cell which comprises the following:-
  - (i) a positive electrode which, in addition to the cathodic active material, contains a compound  $MA_xO_y$ , where M is an alkali or alkaline earth metal and A is a non-metallic element where  $0.3 \leq x \leq 2.0$  and  $1.3 \leq y \leq 4.0$ , such that on charging, the acid anhydride  $A_xO_y$  is generated "in situ", and
  - (ii) a solid composite polymer film acting as separator whose structural units contain basic functional groups containing nitrogen atoms in 5 or 6 member heterocyclic rings or in tertiary aliphatic configuration into which is incorporated an ionisable salt  $LiX$ , having a higher decomposition voltage than  $MA_xO_y$ , where X is an acid radical.
2. An electrochemical cell as claimed in claim 1 wherein the alkali metal is lithium.
3. An electrochemical cell as claimed in claim 1 or claim 2 wherein the non-metallic element is sulphur, nitrogen, carbon or phosphorus.
4. An electrochemical cell as claimed in any one of claims 1 – 3 wherein the acid radical X is one or more of the following:-  
 $AlCl_4$ ,  $BF_4$ ,  $PF_6$ ,  $ClO_4$ ,  $CF_3SO_3$ ,  $N(CF_3SO_2)_2$ .

5. An electrochemical cell as claimed in claim 1 wherein the alkali metal M is lithium, and the element A is sulphur.

6. An electrochemical cell as claimed in claim 1 wherein the compound  $MA_xO_y$  is lithium dithionite.

7. An electrochemical cell as claimed in claim 1 wherein the compound  $MA_xO_y$  is lithium sulphite.

8. An electrochemical cell as claimed in claim 1 wherein the compound  $MA_xO_y$  is sodium dithionite.

9. An electrochemical cell as claimed in claim 1 wherein the solid polymer is poly(4-vinylpyridine), less than 5% cross linked.

10. An electrochemical cell as claimed in claim 1 wherein the solid polymer is poly(vinylpyrrolidone).

11. An electrochemical cell as claimed in claim 1 wherein the solid polymer is thermally restructured poly(acrylonitrile) -(CH=C-CN)n-.

12. An electrochemical cell as claimed in any one of claims 1 – 11 wherein the cathode active material is lithium cobalt oxide  $LiCoO_2$  or a mixed lithium nickel cobalt oxide  $LiNi_{0.85}Co_{0.15}O_2$ .

13. An electrochemical cell as claimed in any one of claims 1 – 11 wherein the cathode active material is lithium sulphite and a transition metal oxide such as  $\text{VO}_2$  or  $\text{MnO}_x$  where  $2 >= x >= 1$ .

14. An electrochemical cell as claimed in any one of claims 1 - 13 when used as a primary or rechargeable battery or a supercapacitor.